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### Clinical Applications of Radioisotopes

Although numerous applications have been found for radioisotopes in the fields of biology and medicine, most of them have been of an investigative nature. In order for a particular application to find its way into clinical medicine, it should be (1) radiologically safe for patient and medical personnel, (2) superior to preexisting procedures, and (3) simple and inexpensive.

Over the last dozen or more years, radioiodine has received extensive consideration from many quarters as an agent to probe the thyroid gland. Rarely, has a single diagnostic procedure enjoyed such interest and multiplicity of applications. In the earliest stages of development of this test, the urinary output of radioiodine after an oral dose was used. Since then, the uptake of radioiodine by the thyroid gland itself, the rate of conversion of inorganic to protein-bound iodine in the blood, the salivary output of iodine, and various methods of fractionating all these studies over a period of time have been described. These investigations have contributed a tremendous amount of information to the basic knowledge of thyroid function.

The authors believe that the routine clinical application of the radioiodine thyroid study can be simplified to one easy procedure, namely, the 24-hour thyroid uptake test. They also employ the conversion ratio in selected cases. They prefer to see these tests carefully correlated with the clinical findings rather than to use other time consuming isotopic procedures.

The thyroid uptake test was found to be valuable in both diagnosis and management of thyroiditis. Subacute thyroiditis is universally accompanied by a low uptake. This indicates that the patient is either in a hypothyroid status or destined to be in such a status in the near future, and points to therapy with some form of thyroid extract. Because the course of this disease is often more chronic than subacute, the uptake also aids in follow-up for it rises to normal when the patient has recovered. In struma lymphomatosa, on the other hand, any sort of uptake may exist and a particularly careful correlation with physical and clinical data is important in arriving at the correct diagnosis.

The thyroid uptake of  $I^{131}$  is not of value in diagnosis of carcinoma of the thyroid. Although thyroid carcinoma is said to be rare in the presence of hyperthyroidism, several such cases were seen. In general, the clinical data should be the determining features in deciding whether carcinoma may exist in a particular case. A thyroid nodule that picks up less iodine than the surrounding thyroid tissue is regarded with suspicion, but this fact is not as important as the patient's age, the multiplicity of thyroid nodules, and recent change in such nodules.

Tens of thousands of patients with hyperthyroidism in this country have been treated with radioiodine which looks like the ideal form of treatment for the diffuse hyperplastic type of goiter. Valid contraindications to its use are



few. The only rigid one in the authors' experience is pregnancy. The next strongest contraindication is childhood or adolescence. Fear of a future carcinogenic effect has led many to limit this procedure to persons over the age of 40 or 50 years. The authors have not felt constrained by such age limitations, although they tend to discourage its use in younger patients. In such cases, surgical treatment is indicated as preferable.

In approximately 85 to 90% of cases of diffuse hyperplastic goiter, cure can be achieved with a single dose of radioiodine calculated on the basis of the uptake and the thyroid size. About 5 to 10% of the patients require an additional dose 6 months to a year later, and another 5% become hypothyroid, although this effect may be only temporary—for 6 to 12 months. Toxic nodular goiter should generally be handled surgically, both to remove the excess nodular thyroid tissue and to relieve any suspicion of carcinoma. In elderly patients, however, radioiodine will successfully relieve the thyrotoxicosis, but will not appreciably alter the size of the nodular goiter. In poor operative risks, it is permissible to ignore the possibility of a lurking thyroid carcinoma and employ radioiodine instead of surgical treatment.

The role of radioiodine in management of thyroid cancer has received wide attention, entirely out of proportion to its importance. Only a small proportion of thyroid carcinomas produce iodophilic metastases that can be handled with this modality.

### Radiophosphorus ( $P^{32}$ )

Radioactive phosphorus or  $P^{32}$ , a pure beta-ray emitter, enters into the metabolism of actively growing tissue and thus lends itself to certain diagnostic as well as therapeutic procedures. Numerous investigations have shown that  $P^{32}$  is incorporated into actively growing cancers. However, unless the cancers are located on or near the surface of the body, it is difficult to measure their  $P^{32}$  content because of the absorption of the beta-rays by a few millimeters of tissue. Nevertheless, with specially adapted Geiger-Müller counters,  $P^{32}$  has proved of value in distinguishing melanotic tumors of the eye. This is of particular importance in cases of detached retina in which the ophthalmologist wishes to know whether a melanoma lies behind the retinal detachment. Although melanomas absorb  $P^{32}$  in greater than background quantities, this is not the case with retinoblastomas, where it is of no value.

Therapeutically,  $P^{32}$  finds its greatest usefulness in treatment of polycythemia vera. The principal reason for treating this disease is to avoid the possibility of thromboses which may occur in the heart or brain as well as in less serious sites. This thrombotic tendency will be the more marked in those patients who have high platelet counts and consequently these counts should receive close attention. Therapy of leukemia with  $P^{32}$  is quite popular in some quarters. The authors believe they can deal with chronic

lymphatic and myelocytic leukemias more efficiently with chemotherapy or radiation with roentgen rays. Small doses of roentgen rays, appropriately delivered with daily blood counts, afford such an accurate guide to the patient's progress that extensive use of  $P^{32}$  is not favored.

### Radiogold ( $Au^{198}$ )

Colloidal radiogold is both a beta-ray emitter and a gamma-ray emitter, principally the former, and has two therapeutic applications: treatment of carcinomatous effusions in the pleural and peritoneal spaces, and interstitial injection into and around tumor masses.

In general, radiogold has been disappointing. It is difficult to select suitable candidates for its application because most of these patients are in the terminal stages of carcinoma. Of those who survive longer than 6 weeks, approximately one-half receive some benefit in that the rate of fluid formation is diminished. This is the only benefit claimed for this type of treatment. At present, the only type of case which the authors believe merits treatment with radiogold is carcinoma of the ovary in which there has been a comparatively "clean" excision of the cancer with the possibility that a few carcinoma cells are floating around in the peritoneal or pelvic cavity.

Radioactive chromium or  $Cr^{51}$  in the form of sodium chromate is now the most widely used radioisotope for tagging red blood cells. It is used both in determining the red blood cell volume and for red blood cell survival studies. Hematologists have found the latter application of value in the study of hemolytic anemias. An alternative and simpler method of determining blood volume is the employment of radioiodinated serum albumin in a dilution method. The entire determination can be completed in 20 to 30 minutes.

Radioactive cobalt or  $Co^{60}$  finds its principal medical application in the form of the teletherapy unit known as the cobalt bomb. Dr. R. F. Schilling of the University of Wisconsin has devised an ingenious test for pernicious anemia which actually determines the presence or absence of intrinsic factor in the stomach lining. This is of particular use in patients who have been under treatment with various vitamin preparations and liver extract. In such cases, the blood picture is normal and it would be necessary to wait several months for the characteristic findings and symptoms of pernicious anemia to become manifest. The Schilling test employs a special form of vitamin  $B_{12}$  in which the cobalt atom of this vitamin has been rendered radioactive. In pernicious anemia, there is practically no absorption of this substance (vitamin  $B_{12} Co^{60}$ ) from the gastrointestinal tract. If a capsule of intrinsic factor is ingested with this substance, the amount of absorption increases considerably. The test also can be employed in the diagnosis of sprue where there is no absorption of vitamin  $B_{12} Co^{60}$  either with or without the addition of intrinsic factor because the absorptive mechanism of the intestinal tract itself is at fault. (Paulson, E. C., Mosser, D. G., Clinical Applications of Radioisotopes: Postgrad. Med., 23: 493-498, May 1958)



### Tumors of the Anterior Mediastinum

The classification of neoplasms that arise in the anterior mediastinum is difficult and uncertain because of the variability in the morphological appearance and clinical behavior of these tumors. Although the number of neoplasms that originate in this region is small, the need for classification has become important since the increased use of thoracic surgery and routine chest roentgenograms has brought to light a greater number of intrathoracic tumors. Generally, it is agreed that teratomas and thymomas are the tumors most commonly found in the anterior mediastinum.

As none of the present classifications was considered satisfactory, a critical review and classification was made of all "tumors" arising in the anterior mediastinum that were seen at the Laboratory of Surgical Pathology, Hospital of the University of Pennsylvania from 1939 to 1955, in the hope that some correlation could be found between the clinical course of the patients and the histopathological appearance of the tumors. In addition, one case from the Henry Ford Hospital in Detroit and one case previously reported by Rose were included. The "tumors" of the anterior mediastinum from 51 patients were classified as follows: 16 thymomas, 3 carcinomas of the thymus gland, 4 non-neoplastic lesions of the thymus gland, 10 malignant lymphomas, 10 teratomas and related tumors, and 8 miscellaneous or unclassified lesions. Metastatic carcinomas and malignant lymphomas involving the anterior mediastinum, but not arising in this region, have been excluded. The clinical and microscopic features of each group and their relative importance in diagnosis and prognosis are discussed.

The confused classification of thymic tumors is reflected in the wide variation in age reported in the literature. In the present series, there was no significant difference in age between patients with encapsulated thymomas and those with nonencapsulated thymic tumors.

The number of patients in the present series was too small and the tumor classifications previously reported were too diverse to serve as a basis for any conclusions on the influence of sex. However, the average age of women in this series was much lower than that of men. This was true both for patients with encapsulated thymomas (average age for women, 26.0 years, for men 57.3 years) and for those with nonencapsulated thymic tumors (average for women 42.0 years, for men 57.3 years).

Many of the patients with thymomas had no local symptoms. This was especially true of patients with encapsulated thymomas, 9 of 11 of whom had no symptoms referable to the tumor. It is not possible to regroup the published series into encapsulated and nonencapsulated tumors, but, judging by the descriptions, there is little doubt that the encapsulated tumors were usually asymptomatic. Also, it is apparent that most of the thymomas associated with myasthenia gravis were asymptomatic and usually were encapsulated. Atypical and pleomorphic tumors of the thymic region that do not satisfy morphological criteria for thymomas seldom, if ever, are associated with

myasthenia gravis. In the present series, the 3 patients with myasthenia gravis had no local symptoms attributable to their tumors which, histologically, were typical thymomas. Furthermore, relatively fewer deaths occurred among patients without symptoms referable to their tumors (2 deaths in a group of 18 patients) than among patients with such symptoms (3 deaths in a group of 6 patients). Two of the patients in the latter group who died had carcinoma of the thymus gland.

Thymomas have been defined as slow-growing tumors of the thymus gland that are composed of lymphocytes and epithelial cells and either remain localized or spread by direct extension into adjacent structures. In this article, the term thymoma is restricted to tumors of this type. Pleural implantation is not unusual in these cases, but extension of the tumor into the neck or axilla has been described less frequently. Occasionally, ectopic thymic tumors have been found in the neck or at the hilus of the lung, and, infrequently, distant metastases have been described. However, some of the "thymomas" reported to have distant metastases were probably malignant lymphomas. Because of the difficulty in distinguishing between benign and malignant thymomas, the authors have not attempted such a separation. Instead, they have divided the thymomas in the present series into encapsulated and nonencapsulated tumors and have found that, in most instances, this correlated with clinical behavior. All of the tumors described are believed to have been of thymic origin with the exception of a few in the miscellaneous group.

In the authors' experience and that of others, the most frequent primary tumors of the anterior mediastinum were thymomas, teratomas, and malignant lymphomas. Thirty-one percent of the present cases were thymomas, 6% were intrinsic carcinomas of the thymus, 20% were teratomas and related tumors, 20% were malignant lymphomas arising in the anterior mediastinum, and 23% were miscellaneous tumors and non-neoplastic lesions. In many reports, malignant lymphomas have been excluded because they were considered to be manifestations of generalized disease rather than primary tumors of the anterior mediastinum. Nevertheless, in the differential diagnosis of tumors of this region, malignant lymphomas must be considered; recent clinical and experimental work suggests that many malignant lymphomas—especially Hodgkin's disease—may arise primarily in the thymus gland.

The thymoma was found to be a distinctive tumor of the anterior mediastinum composed of variable proportions of lymphocytes and epithelial cells. The patients with encapsulated thymomas had a relatively more benign clinical course than did those with nonencapsulated thymomas. No histopathological characteristics were observed that would distinguish benign from malignant thymomas.

Several microscopic features proved useful in differentiating thymomas from malignant lymphomas of the anterior mediastinum. These included:



a characteristic cellular pattern; the spindling of epithelial cells; the presence of characteristic cystic spaces; the relative absence of pleomorphism and fibrosis; and the presence of mature and immature Hassall's corpuscles. A distinctive adenomatoid pattern was found in several thymomas.

Clinically, patients with thymomas differed from those with malignant lymphomas. Thymomas occurred in an older age group and were associated with myasthenia gravis in 19% of patients who frequently were otherwise asymptomatic. Patients with thymomas had a longer clinical course than did those with malignant lymphomas and, although less responsive to radiation therapy than the malignant lymphomas, the thymomas did not metastasize.

Five patients with benign cystic teratomas and 5 with malignant teratomas or related tumors were included in this series. Three of the tumors in the latter group were growing predominantly as seminomas and the patients showed long-term survival. (O'Gara, R. W., Horn, R. C. Jr., Enterline, H. T., Tumors of the Anterior Mediastinum: Cancer, 11: 562-589, May-June 1958)

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### Cytology in Gastric Cancer

Introduction of the Papanicolaou method of cytologic study and recent refinements of gastric smear technique, such as the use of abrasive devices and mucolytic agents, have stimulated renewed interest in desquamative cytology in the diagnosis of gastric cancer. Recent reports indicate that the accuracy of the modality now equals that of pulmonary and gynecologic cytology.

Despite the application of refined techniques and the acquisition of increased experience, investigators still encounter cytologic failures. These have been attributed to unsatisfactory preparations, gastric retention, overlooked cancer cells, intramural tumors, necrosis in large tumors, and ulcer craters covered with necrotic membranes. Certain types of gastric cancer, such as anaplastic carcinoma and lymphoblastoma, have also presented diagnostic difficulties. Although very small neoplasms were sometimes missed, in many instances they yielded positive smears.

This is the report of a study undertaken to determine the significance, if any, of location and pathologic type of gastric cancer in cytologic diagnosis.

Gastric washings from 150 patients under investigation for possible stomach cancer were obtained by moderately forceful flushing of buffered chymotrypsin solutions through a Levin tube. No abrasive device was used. The material was processed and stained according to the method of Rubin, et al. Four smears were prepared from each specimen and when no malignant cells were found, the smears were examined for at least 30 minutes before being reported as negative. Unsatisfactory specimens were obtained

from 34 patients including 10 who subsequently had proved gastric cancers. Specimens were considered to be unsatisfactory when no gastric columnar cells were present, the cells were markedly autolyzed, or there was heavy contamination with retained food particles and other debris. Most of these unsatisfactory specimens were encountered in the early phases of this study when the importance of adequate preparation of the patient was not realized. However, in a few instances, repeated attempts to obtain adequate material were without success. Because there was no relationship between these poor specimens and the pathologic type of cancer, these cases have been excluded from this report except in reference to location of the cancers.

The cancer group consisted almost entirely of patients who had histologically proved cancer of the stomach. There were a few cases of advanced inoperable neoplasms which were not confirmed pathologically. The "non-cancer" group was made up of patients who had gastric complaints, but no roentgenographic, gastroscopic, or clinical evidence of carcinoma.

### Conclusions

The accuracy of cytologic diagnosis of 38 gastric cancers by a chymotrypsin lavage technique was 89.5% (65.8% positive, 23.7% suspicious). Negative smears were found in 92.3% of 78 patients who did not have cancer of the stomach.

There were 2 false positive reports (2.6%). Ten of 17 cancers in the distal portion of the stomach were detected cytologically. These 17 cases included 6 patients who had unsatisfactory specimens. The best results were obtained from patients who had neoplasms located at the cardia or which involved a major portion of the stomach.

Equivocal smears were encountered most frequently in ulcerating cancers, probably because of a barrier of necrotic cells. Polypoid and diffusely infiltrating neoplasms were detected with greater accuracy.

Positive smears were found in 17 of 20 (85%) adenocarcinomas, 1 of 7 (14%) anaplastic carcinomas, and 2 of 4 (50%) lymphoblastomas. The lower accuracy in the anaplastic carcinoma group was probably the result of failure to recognize the less conspicuous undifferentiated cells.

The comparative cytologic features of well differentiated and anaplastic carcinomas are presented. There were no false negative results in the scirrhous carcinoma group, but 19% of the medullary carcinomas were missed cytologically because of greater anaplasia, necrosis, and secondary inflammation.

Multiple cytologic specimens should be examined when the initial smears give equivocal or negative results.

(Umiker, W. O., et al., Cytology in the Diagnosis of Gastric Cancer - The Significance of Location and Pathologic Type: Gastroenterology, 34: 859-865, May 1958)



### Study of Ptosis

This study is based on a personal survey of the hospital record of 142 consecutive patients with blepharoptosis admitted to Los Angeles Childrens Hospital. Surgery was deferred in 16 cases while in the remaining 126 patients, 181 operations, using some 17 techniques of ptosis repair, were performed by the ophthalmology attending and resident staffs.

All clinic cases were seen in the eye clinic where they were evaluated by the eye staff and the mode of management was determined. When the cases appeared to be unusually difficult, the patient was seen in consultation by other members of the staff. Occasionally, a case required presentation to the eye conference.

Ptosis may be congenital or acquired. In this series of 142 cases, only 4 were definitely acquired: one resulted from trauma during an automobile accident, another followed a chronic attack of vernal catarrh, a third resulted from neurofibromatosis, and a fourth was associated with lacrimal gland tumor. In one case, a borderline bilateral ptosis was present at birth which was later aggravated by a severe attack of scarlet fever.

Of the 138 congenital cases, 83 were males and 55 females. Of those in which the ptosis was associated with anomalies of the lid, 10 were males and 9 were females, but in the 6 with jaw-winking, sex distribution was even.

In this series, congenital ptosis affected the male (83) more frequently than the female (55). Briggs reported 64 cases of congenital ptosis in 23 families, 33 in males, 30 in females, and one of sex unknown.

Of the 138 congenital cases reported in this study, 105 (or approximately 76%) were unilateral and 33 (or approximately 24%) were bilateral. The cause of congenital ptosis in this series was not well explored. In 5 cases in which biopsy of the levator muscle was done, there was evidence that the muscle fibers were sparse and replaced in places by fibrous or fatty tissue.

Birth injuries were possible in 34 instances, but in only one was reference made that forceps had directly injured the upper eyelid in one eye. However, it is possible that one or more could have been similarly injured. According to Edgerton, the remote effects from intracranial hemorrhage and trauma often result in ptosis, nystagmus, defective vision from disease of the ocular tract, and paralysis of the ocular muscles.

Berkeley stated that fracture of the skull or laceration of the tentorium might produce intracranial hemorrhage followed by ptosis of the lids, paralysis of the external rectus muscle, or a combined paralysis of the sixth and seventh nerves. Ptosis is frequently observed at birth, but usually disappears in a few days according to Holt; when it fails to improve, this may be due to a defect in development or absence of the levator muscle.

The influence of heredity was definitely shown in 14 cases. This was especially true in those cases with some other defects, such as epicanthus, blepharophimosis, torticollis, hypertelorism, and congenital heart disease.



In three cases with unilateral lid-droop, the father or mother or grandfather had ptosis on the same side as that of the offspring. In one case with bilateral ptosis, blepharophimosis, epicanthus, and congenital deafness, family history revealed five members with congenital ptosis in two generations.

From the facts cited, one may safely conclude that congenital ptosis may be the result of a genetic defect or of injury taking place in the embryonic or fetal stage of development or at birth. Any type of ptosis starting from any cause after birth will fall under the acquired group.

A few words must be said about the prevention of complications in ptosis surgery. The age-old adage, "an ounce of prevention is better than a pound of cure," is especially applicable in ptosis surgery because once a mistake is committed in the first procedure—especially in levator shortenings—the chance of obtaining a perfect result are considerably diminished. Because the operation is a form of plastic surgery devised to improve the patient's appearance, anything short of perfection may make everybody unhappy—the patient, the parents, and the surgeon himself. Moreover, ptosis surgery is unlike strabismus procedures where imperfections can be more easily smoothed out by another operation or where orthoptists can be of great help.

The prevention of complications is difficult in view of the fact that certain ptosis techniques and certain complications are closely associated—or even inseparable. A review of the literature reveals a number of complications encountered in specific types of blepharoptosis surgery.

Many ptosis surgery techniques have come and gone. Some were good for certain cases, but unfortunately were misapplied. It is suggested, therefore, that the eye surgeon should refrain from making all patients suit a favorite technique, but rather choose the technique that best suits the patient. It is emphasized that, once a mistake is made in the choice of the first procedure or in the actual surgery itself, the chances for success will not be as good in the second surgical intervention—and much less in the third. (Carbajal, U. M., An Analysis of 142 Cases of Ptosis: Am. J. Ophth, 45: 701-703, May 1958)

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#### Change of Address

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### Oral Manifestations of Leukemia

Oral mucosal changes are recognized by medical and dental clinicians as a most disagreeable manifestation of leukemia. Because leukemia is being investigated in the Clinical Center, National Institutes of Health, there are available for observation and study a comparatively large number of patients with this disease. Several aspects of oral changes in leukemia are being studied and some findings are available for consideration.

Oral mucosal abnormalities in leukemia patients were noted periodically for one and one-half years. Thirty-eight different patients were followed for varying lengths of time. In addition, large numbers of microscopic sections of oral tissues of leukemia patients, secured at autopsy, have been collected. Valuable dental clinical experience has been gained in treating the great number of oral problems in these patients.

Remissions in untreated cases of the acute form of leukemia are said to be rare. If remission does occur, however, it is interesting that oral lesions improve. With the advent of the antimetabolite and steroid drugs, temporary remissions are being produced.

While, in the final analysis, drugs now used to treat leukemia result in increased life span, a number of side effects are seen. The antimetabolite drugs used were Methotrexate and 6-mercaptopurine. It is of interest that one of the toxic effects of these drugs is a characteristic stomatitis. The lesions are 1 to 5 mm. in diameter with white centers and inflammatory margins, closely resembling aphthous ulcers and may be circular or have irregular edges.

Because infections are a frequent occurrence in leukemia, antibiotic drugs are used extensively. Monilial overgrowth is a severe problem and is probably due to both the general debilitation of the patients and the frequent administration of antibiotics. Patients have developed septicemias after perforation of mycotic-induced ulcers in the gastrointestinal tract. In the mouth, secondary mycotic infection is also a great problem. Gentian violet applied topically is often effective in controlling the oral monilia when it first appears, but many strains become resistant to it. Also, effective in some cases is nystatin.

In this study, there were 9 cases of myelogenous leukemia and 29 cases of lymphogenous leukemia. Study of the medical records of the 38 patients revealed that in 23 cases, or 60%, the white blood count was consistently subleukemic. The antimetabolite and steroid drugs were probably responsible for this high percentage of subleukemic counts. It was also observed that a manifestation in 84% of the cases was "severe" thrombocytopenia which for discussion indicates platelet counts consistently less than 60,000 per cubic ml. Of the 38 cases periodically examined, 80% had positive oral findings.



Oral changes in six classifications were consistently recorded. The incidence of each among all leukemic patients was: nonspecific gingivitis, 53%; hypertrophic gingivitis, 45%; Vincent's gingivitis, 3%; frank bleeding, 42%; ulcerations (due to leukemia, not antimetabolite drugs), 39%; and petechiae or localized ecchymoses, 35%.

The percentage of bleeding patients is further discussed. The 42% figure is a minimum one because it is likely that bleeding occurred in other patients between oral examinations which were at least one week apart. The selection of 60,000 platelets per cubic ml. as the level below which the so-called "severe" thrombocytopenia existed was based on the opinions of some hematologists that when the platelet count is above the 60,000 level, bleeding is much less likely to occur than when it is below 60,000. In most of the thrombocytopenic cases, platelet counts were far below 60,000 per cubic ml. Many were actually consistently below 5000 per cubic ml.

Generally, it is agreed that the hemorrhagic tendencies observed in leukemia are due primarily to the thrombocytopenia. Platelets occupy a prime position in the initiation of blood coagulation. Therefore, any attempt to prevent or stop bleeding caused by thrombocytopenia must involve supplying either platelets or some substance which will obviate the need for platelets. In the treatment of hemorrhage, it is obvious that if local measures can be devised which produce adequate hemostasis, these methods are to be preferred to those involving whole blood transfusions.

The histopathologic findings are of clinical value. The heavy leukemic infiltration into traumatized gingival tissues and the comparative absence of leukemic infiltration in the gingival connective tissue of edentulous patients points to the assumption that clinical gingival changes are the result of trauma to the gingival tissues with consequent extravasation of leukemic cells.

In the series of 38 cases, the patients who presented no oral pathologic findings were either very young or edentulous. The shallow gingival sulcus and scant calculus formation in the young, as well as the absence of interdental irritation in edentulous patients, appears to minimize their oral difficulties. It seems logical that by maintaining good oral hygiene in leukemia patients that oral manifestations can be reduced. The most important single recommendation would be to give particular attention to the interdental areas with periodic removal of calculus and prophylaxis. This should be done first whenever the patient is reasonably comfortable and should be repeated at regular intervals as long as practicable. Once leukemic infiltration of the gingival tissues occurs, with concurrent gingivitis, palliative treatment with topical gentian violet has been reasonably effective. This drug has also been used effectively to reduce the pain and infection in oral ulcerations as is mentioned in relation to moniliasis. (Duffy, J.H., Driscoll, E.J., Oral Manifestations of Leukemia: Oral Surg., 11: 484-490, May 1958)

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### Neostrophingic Mobilization

During the 9 years which have elapsed since the initial presentation of the first successful modern-type operation for mitral stenosis, many logically to be expected advances have taken place in understanding this disease in medical and surgical management and in operative technique. Members of the medical profession—although skeptical and reluctant at first—have accepted the initially proposed procedure with what has seemed to the innovator to be unbridled and uncritical enthusiasm. This operation has been described under the names "commissurotomy," "valvulotomy," "valvuloplasty," and "valvotomy," although all of these terms have indicated an essentially identical technique.

It is now the duty of the authors to confirm the over all conclusion of dissenters that this is in many respects a disappointing procedure and to suggest in its stead a more logical and more extensive operative mobilization of the mitral valve based upon a different mechanical principle which—it is hoped and believed—will overcome the disadvantages and shortcomings of the older technique. In order to avoid the possibility of confusion with the original operation for mitral stenosis, an entirely new descriptive name for the procedure is suggested: neostrophingic mobilization of the septal leaflet.

While the objections to the former method of commissurotomy apply with special force to those procedures which have been performed through the disadvantageous left-sided approach, they also are pertinent in lesser degree to similar operations performed from the right. It was as much limitation of the earlier concept which restricted the surgeon's operative initiative as the technical faults in his approach. The fundamental criticisms are:

1. Because of technical and conceptual limitations, the extent of valvular mobilization achieved by efforts at commissurotomy by the older method usually amounted to but 20 to 30% of the ideal. In two-thirds of the patients, but one commissure was opened. It is believed that the percentage of functional restoration usually has been significantly low. This has been attested by the consistent persistence of auscultatory manifestations of mitral stenosis after surgery as well as by physiologic evidences of residual obstruction at the valve level.

In many instances, this residual stenosis was reinforced and aggravated by an element of subvalvular stenosis, usually unrecognized, and less often relieved (now believed to be present to a significant extent in more than one-half of these patients).

2. Inadvertent production of significant mitral regurgitation. This was a logical and not infrequent end-result of the customary employment of the clumsy and inefficient left-sided approach and the uncertain orientation which it affords.



3. Unsatisfactory clinical course of operated patients. While it is believed that over 75% of patients receive significant benefit from a mitral commissurotomy operation, in many cases this has amounted merely to prolongation of a life of invalidism rather than to the rehabilitation which an ideal correction of the mitral obstruction might have offered.

4. The increasing evidence that mitral commissurotomy is attended by a high incidence of recurrence of mitral stenosis after the elapse of several years. It is believed that 20 to 40% of patients operated by the older technique will suffer from restenosis and ultimately will require repetitive surgery.

5. A seemingly irreducible incidence of arterial embolization due chiefly to dislodgment of thrombotic fragments from a clotted left auricular appendage.

After a 9-year clinical experience including more than 2000 patients subjected to mitral commissurotomy through the standard left-sided approach, and close to 500 operated during the past 4 years by the right-sided method, a new and technically much superior type of valve mobilization has been evolved. It is based upon the principle of converting the irretrievably destroyed flutter-valve action of the mitral valve to an efficient flap-valve mechanism.

This effect is accomplished by a rehinging or new-hinging of the septal cusp, not only through its flexible mid-zonal tissue, but also with respect to the usually shortened papillary suspension yoke which must be split longitudinally. Such a maximally corrective procedure has been described under the term "neostrophingic mobilization" of the valve. It cannot routinely be accomplished except with the technical advantage of the right-sided approach.

It has been shown that most patients with mitral stenosis have received but partial (as shown by the persistence of auscultatory signs) and often temporary relief of their valvular obstruction when the older left-sided commissurotomy procedure has been carried out. Restenosis ultimately may be expected in a large proportion of these patients who have, in actuality, been subjected merely to linear (and limited) division of a fibrous stricture. It is believed that recurrence of mitral stenosis after complete neostrophingic mobilization will be rare indeed because the operation amounts actually to construction of a valve mechanism of different type, and because the tissue cleavages extend well into normal unfibrosed structures.

The early operative mortality and morbidity associated with complete reconstitution of the valve is distinctly less than that associated with less complete operations.

Because of certain unavoidable handicaps experienced during attempts to carry out an extensive mobilization of the valve structures with maintenance of full competence when the open technique is employed (using the pump oxygenator), it is believed that a better and safer reconstitution of the



mitral valve can be achieved by the closed method. (Bailey, C. P., Hirose, T., Maximal Reconstitution of the Stenotic Mitral Valve by Neostrophingic Mobilization (Rehinging of the Septal Leaflet): J. Thoracic Surg., 35: 559-582, May 1958)

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### Operative Decompression of Intestinal Obstruction

Decompression of distended small intestine prior to surgery for mechanical obstruction is indicated whenever possible. Under certain circumstances, however, decompression by nasogastric intubation may not be successful. A noncooperative or irrational patient may either prevent the insertion of a tube or withdraw it once it has been passed. Rarely, the coexistence of pyloric or duodenal obstruction may preclude passage of a tube into the small intestine. In late obstructions, the tube may not readily transverse an atonic small intestine, and valuable time will be lost in futile attempts at intubation. In the presence of strangulation obstruction, operation must be performed without delay—hence without the opportunity for long-tube decompression.

The wall of the obstructed intestine is often too thin and friable to be manipulated with impunity. A search for the obstructing point by uncoiling loops of distended bowel may inflict additional damage to the weakened intestinal wall and result in perforation and leakage. Primary resection and anastomosis of an obstructed distended segment is fraught with danger because sutures will not hold in an edematous, thinned-out bowel wall. Evacuation of intestinal contents proximal to the obstruction restores tonicity of the bowel muscle. Surgical manipulations, including anastomoses, then become less hazardous. Improvement in circulation and restoration of muscle tone of the bowel wall also promote earlier resumption of normal intestinal activity and hasten the patient's postoperative recovery. For these reasons, it is desirable that the contents of the obstructed small intestine be removed as completely as possible at the time of surgery.

Currently accepted methods of decompressing the distended small intestine at operation include: (1) multiple needle aspirations of distended loops; (2) inlying short catheter enterostomy; (3) aseptic decompressive suction enterotomy; and (4) introduction of the Grafton Smith tube into the intestine via the nasogastric route by means of a flexible stylet.

The authors have devised and used a method which decompresses the small intestine by long-tube jejunostomy. They believe this is preferable to any of the foregoing enterotomy techniques because: (1) It is relatively atraumatic because enterostomy may be done in the highest or presenting jejunal loop before searching for the point of obstruction; (2) It effectively decompresses the entire small intestine in a few minutes' time through a

single enterotomy; (3) It allows suction to be maintained at any desired level during the remainder of the operation and prevents pooling of intestinal contents near the operative site; (4) It permits a long tube to remain in the lumen of the bowel for continued decompression in the postoperative period and serves as an intraluminal splint which may prevent kinking of intestinal loops; and (5) When indicated in certain unusual circumstances, it may be utilized as a feeding jejunostomy during convalescence by simply adjusting the position of the tube.

The technique is as follows: A sterile single lumen, long intestinal tube with a mercury-weighted balloon (of the Cantor or Harris type) is introduced through a high jejunotomy by either a simple incision or through a trocar. Spillage is prevented by snug traction on a purse-string suture placed in the jejunal wall prior to making the enterotomy. Suction applied to the tube empties the most proximal jejunal loop. Additional length of tube is guided through the jejunotomy and, assisted by the weight of the mercury, passes into the distended loop. As each loop is evacuated, it is gently gathered on the tube. Trauma to the intestinal wall is minimized because manipulation of the intestine involves only decompressed segments. Successively, all loops of the intestine down to the point of obstruction are decompressed in this manner. The enterostomy is inverted around the tube with the previously placed purse-string suture. Omentum is interposed between the jejunum and abdominal wall. The proximal end of the tube is brought through a stab wound in the left upper quadrant and fixed with a suture in the skin. Suction on the tube may be continued throughout the operation and decompression is maintained postoperatively. The tube is removed when intestinal activity has resumed and decompression is no longer necessary. The jejunostomy closes spontaneously. (Straehley, C. J., Jr., Gullick, H. D., Operative Decompression of Intestinal Obstruction by Long-Tube Jejunostomy: Surgery, 43: 774-776, May 1958)

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### Infection Lurks in the Janitor's Closet

Sepsis acquired by patients or personnel in hospitals is a serious problem throughout the world. How does a stranger estimate the likelihood of a particular hospital's having a problem in simple asepsis in contradistinction to a complicated problem in environmental sepsis? A description of the physical examination of a hospital that has requested help to combat sepsis may assist in broadening professional concepts that currently hamper reforms essential to control of a spreading scourge.

As the hospital is entered, look at the periphery of the floor. Rub the floor with the flat of a hand to retrieve a sample of surface soil. Seek the porter with the mop and brush. Inspect the service closets. This approach is



significant because environmental sepsis is seldom transmitted directly from patient to victim, but usually through an unbelievable chain of circumstances in which the organism fresh from its source, disease, is introduced to a multiplier where the individual organism is turned into millions or billions. The organism is then tucked away in a reservoir where it may be kept for weeks or months. Try to identify these factors: the multiplier, the reservoir, and the distribution system.

The janitor's closet is a good reservoir. Most mopping results in painting the floor with a thin slurry of bacteria and dirt. This results because germicides—even when used—are quickly depleted from the mopping water and residual bacteria multiply in the moisture and generate warmth in the mop to accelerate the process. When new water is added, it is simply sloshed around and the bacteria are redistributed. New ones shed by diseased patients are picked up to contaminate the mop for multiplication and spread the next day.

Habits of floor care must be changed to provide for flooding the floor with enough detergent germicide to disinfect the surface. A wet pickup vacuum must be used to remove excess moisture and suspended dirt and to leave the floor physically clean at the end of the process instead of coated with a dry film of contaminated mop water.

Examine the lavatories. Are there treadle-operated dispensers or bars of ordinary soap? When one is hunting prevailing organisms in a septic environment, the bar of soap is a good source. Successive fingers leave their contribution in exchange for a load of contamination produced in this ubiquitous multiplier.

Look at the bedding habits of the hospital. What happens to the overbed blankets? Are they simply folded at dawn and stored in a common blanket closet until dusk when they are dispensed to the patients with no attempt at isolation?

This brings up the problem of terminal care of bedding. What happens to pillows, mattresses, and blankets on discharge of the patient? Are the beds cleaned and disinfected? There are hospitals in which blankets wear out in overbed service without ever being laundered. The bed rails in most hospitals are revolting accumulations of dust, blood, and excretions.

Next, inspect the bedside water. If you culture the water supply in most hospitals as it comes from the tap, you will be surprised to see that it is sterile. If you culture the bedside carafe in hospitals, you will be shocked to find the bedside water is akin to dilute sewage, with numerous coliforms, staphylococci by the hundreds and other bacteria too numerous to count.

In the division of labor that has progressed frantically in hospitals for the last decade, many vital functional assignments have been forgotten. Bedside water carafes are one of them. They are no longer sterilized daily. The ice used to cool them is not handled hygienically and is one of the big

carriers in spreading environmental sepsis. Carafes must be of material that can be heat sterilized, they must be filled by "no touch" technique with ice which has never reached the melting point, and they must be filled directly from the tap.

Remember that each time the patient sips water through a straw from a bedside carafe, he inevitably contaminates that water by saliva running down the straw at the end of each sip to inoculate this multiplier at the patient's bedside. This is why carafes must be sterilized daily rather than on discharge of the patient.

Prowl through the hospital laundry. In many laundries, you find pus-filled dressings, perineal pads, old mops, magazines, newspapers—everything coming down the laundry chute with the laundry. You see how well the nurses and ancillary employees are trained in disposing of used material. You get some idea of how often blankets are used to mop the floor, how much of the linen is used as cleaning rags. How heavy is the soil? How wet is the textile? Soiled linen which is wet, accumulated for a day or two before it is laundered, is a wonderful multiplier for bacteria.

Is the sorting room under negative pressure ventilation? Is the laundry completely sorted and washed every day so there is no residual laundry to serve as a multiplier day after day? In many hospitals you will find a backlog of soiled linen three or four feet high which is never reached in the sorting. This is the compost of the laundry.

A safe laundry maintains the washer area under negative pressure and washes the linens prior to sorting. Be certain there is positive pressure ventilation about the extractors and in the finishing room. Make certain a germicidal textile lubricant is used in the final rinse so that the textiles are bacteriostatic, not because this adds great magic in controlling cross infection at the bedside, but because it is highly effective in checking the growth of bacteria in soiled linen. From this point of view, it eliminates an occupational hazard from the laundry and avoids contaminating the finished product.

The next thing to look for is the distribution system, either built into the hospital by faulty architecture or improvised in an attempt to gain comfort. Look for evidences of vicarious ventilation.

In many epidemics, organisms have been shown to be liberated in the necropsy room in the basement of the hospital to arrive in surgery on the top floor within a matter of 8 or 10 minutes by way of the convection chimney—the stairwell. This an effective means of cooling both the pathology department and the operating room, but it is also an effective means of spreading sepsis.

Look for exhaust fans that have been installed in utility rooms, in kitchens, almost anywhere, to pump out heated vitiated air from the building. Areas of negative pressure are created that are relieved by uncontrolled drafts under doorways or through corridors in various parts of the building.



These drafts have been shown to spread sepsis widely. Exhaust fans and exhaust ventilating systems must be eliminated to make hospitals safe.

Examine the air conditioning—a relatively new hazard. Air conditioning usually involves refrigeration. During refrigeration, moisture condenses out of the air on the refrigerator coils. Sooner or later, bacteria impinge on the coils, grow in the residual moisture, and you have an ideal multiplier. An air conditioning system also provides some degree of humidification. The humidifiers become contaminated and many not only humidify the air, but also disperse bacteria. Look at the filters; see how well electronic precipitators are maintained. Examine the humidifiers. Scrape the bottom of the plenum chamber to see if there is a green slimy film of *Proteus* or *Pseudomonas* culture growing there or whether it is kept clean.

Finally, put out vermin traps. People are a small part of the population in most hospitals; silverfish, rats, and roaches outnumber people by far. These are nocturnal and many people never think about them. By the simple expedient of putting a piece of adhesive up the side of a drinking glass, putting some breakfast cereal in the drinking glass along with a few drops of water, and leaving it out at night—you'll be surprised how much fun you can have in surveying the wild life of the average hospital. This wild life is important because it runs everywhere and distributes the organisms that must be confined.

Then, ask questions of the administrator. What kind of bacteriological control does he have over the various processes of patient care? Has he culture reports showing that the bedside water is sterile? Has he cultures showing what the bacteriology of the operating room floor is? Does he have a culture of the plenum chamber periodically?

Most hospitals do not take cultures of this kind at all. These health centers are completely without criteria of hygienic performance. Bacteriologic control should be a part of administering a hospital. Otherwise, there is no way of knowing how effective environmental sanitation actually is. (Walter C. W., *Infection Lurks in the Janitor's Closet - Review of Some Things Hospitals Do and Don't Do from the Housekeeping Standpoint*: Mod. Hosp., 90: 132-134, May 1958)

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### Malignant Melanoma

In most classifications of the radiosensitivity of tumors, malignant melanoma is grouped with the sarcomas of bone and soft tissue as a radio-resistant lesion. It is, however, seldom stated whether this opinion is based on personal experience or whether the statement has simply been copied from one publication to another. Similarly, it is often said that radiation therapy,



except when used in cauterizing doses, is useless in the treatment of this disease, although in centers where well planned radiation therapy is employed, there is evidence that this method is of definite value.

It is probably true that no malignant melanotic tumor is curable by radiation alone, and that surgical excision of involved areas offers the patient the best chance of survival, but local recurrence in the primary site or in the lymph node areas is all too frequent. For this reason, a very wide and frequently mutilating operative procedure is attempted. An alternative to this drastic surgery is suggested in this study.

Neither surgery nor radiation therapy alone will cure a majority of patients with malignant melanoma, and it is of some interest to inquire whether a combination of these modalities will improve the prognosis. This study, therefore, evaluates the efficacy of postoperative irradiation. To this end, all case histories in the tumor registry of the Toronto General Hospital were drawn and examined so that cases which had not been treated in this fashion were available for comparison of end-results.

No case of prepubertal melanoma was included in the series, for it is well known that such lesions are indistinguishable histologically from malignant melanoma, although the clinical course may be entirely benign. Secondly, melanoma of the uveal tract was excluded, for this condition appears to run a more chronic course than melanoma of the skin. All available sections were reexamined by an independent pathologist who was unaware of the clinical story or of the ultimate outcome of the case, and a few cases were discarded on his doubt as to the malignancy of the original lesion. In some instances, the original sections could not be obtained and these cases were excluded if the subsequent course of the case was entirely benign. If the history showed that metastatic disease developed later, the case was included in the study. The total number of case histories finally available was 254, consisting of 188 from the Toronto General Hospital and 66 from Johns Hopkins Hospital and the U. S. Public Health Service Hospital, in Baltimore.

The classification suggested by Sylvén was adopted. The status of the patient at his first appearance at hospital for definitive therapy was determined from the available clinical and laboratory information, and the case placed in the appropriate stage of the following classifications: Stage I. Localized melanoma confined to the skin. Local recurrences and nearby deposits in cutaneous lymphatics are included. Stage II. Cases with regional lymph node metastases confined to one gland station only. Stage III. Metastatic involvement of two or more groups of lymph nodes and cases with distant metastases evidencing generalized tumor process.

In this series, the relative frequency was: Stage I, 102 or 43.5%; Stage II, 93 or 39.3%; Stage III, 39 or 16.6%.

The treatment policy at Toronto General Hospital was to operate on all cases of malignant melanoma in Stages I, II, and occasionally in Stage III with a wide excision of the primary tumor and the immediate lymph drainage areas;



then to give postoperative radiation therapy to all areas which were found on histologic examination to contain disease. Not infrequently, however, this policy was not adopted and a number of cases treated by surgery alone were found. In the cases from the two Baltimore hospitals, a few were treated by surgery with irradiation, but the majority received no radiation therapy in the initial stages, being referred only for palliative irradiation when the disease had recurred. The majority of Stage III lesions were treated by palliative means only.

A 5-year survival rate of 41% has been achieved in a series of 121 cases of malignant melanoma treated by surgery and postoperative irradiation or by palliative radiation therapy.

Surgery in Stages I and II consisted in most cases of a wide excision of the primary growth and the immediate lymph drainage areas. Radiation therapy was delivered to all areas found to contain disease. It is submitted that the opinion that radiation therapy is valueless in this disease is based on experience with inadequate dosage.

The survival rates reported are higher than those of other series treated by surgery alone, although the material of this report appears to be comparable in all respects.

It is suggested that postoperative radiation therapy in association with wide excisional surgery is an adequate alternative to ablative and deforming operations. (Dickson, R.J., Malignant Melanoma - A Combined Surgical and Radiotherapeutic Approach: Am. J. Roentgenol., 79: 1063-1070, June 1958)

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#### Admiral Kenney Awarded Honorary Degree

Rear Admiral Edward C. Kenney MC USN attended the Annual Commencement Exercises at Denison University, Granville, Ohio, on 9 June 1958. He was the recipient of the Honorary Degree of Doctor of Science, conferred by Doctor A. Blair Knapp, President of the University. Admiral Kenney was a student at Denison from 1923 to 1926 when he received his Bachelor of Science Degree before entering the Medical College of the University of Cincinnati to study medicine. While at Denison, he became a member of Sigma Alpha Epsilon Fraternity and the Denison Athletic Association, participating in varsity track.

Admiral Kenney is presently on duty in the Bureau of Medicine and Surgery as Assistant Chief for Personnel and Professional Operations. He is a member of the American Medical Association, the Association of Military Surgeons, a Fellow of the American College of Physicians, and a Diplomate of the American Board of Internal Medicine.



From the Note Book

1. William R. Charette HM1, the only enlisted man on active duty in the Navy holding the Congressional Medal of Honor, was designated to make the selection of the World War II Unknown Serviceman for interment in Arlington National Cemetery. (TIO, BuMed)
2. A group of outstanding civilian physicians met at the National Naval Medical Center, Bethesda, Md., on May 23, 1958, to discuss the Navy's Graduate Medical Training Program with the Surgeon General, Rear Admiral B. W. Hogan MC USN and his staff. Each member of the Board represented one of the medical specialties; the majority of them, in addition to being recognized specialists, hold teaching positions at well-known medical schools throughout the country. (TIO, BuMed)
3. The monthly meeting of the Charleston County Medical Society was held at the U. S. Naval Hospital, Charleston, S. C., on 20 May 1958. Approximately 150 members of the Medical Society attended the meeting. The Scientific program was presented by staff members of the Hospital. (USNH, Charleston, S. C.)
4. The Dental Division, Bureau of Medicine and Surgery sponsored a conference of officers concerned with dental technician training on June 5-6 1958, at the U. S. N. T. C., San Diego, Calif. The objectives of the conference were to evaluate the present dental technician training programs, to recommend changes for improvement of the programs, and to consider necessary changes in pertinent examinations. (TIO, BuMed)
5. A year-long pilot study has shown the radioactivity in all milk examined to be well below the permissible limits agreed upon by the National Committee on Radiation Protection and Measurement. The study, which is to be expanded, was conducted in five geographic areas—the milk sheds serving Sacramento, Salt Lake City, St. Louis, Cincinnati, and New York City. (HEW, PHS)
6. The National Bureau of Standards has recently made available 14 standard samples of phosphors selected in cooperation with the Electrochemical Society. The samples were prepared under the supervision of Dr. A. F. Forziati in the dental research laboratory and may be obtained from the Standard Sample Section, National Bureau of Standards, Washington 25, D. C. The phosphor samples are for industrial and research use in quality control and development of improved phosphors for radar screens, television sets, and radioactivity counters and detectors. The main concern in preparing the samples was to achieve uniformity of characteristics and thus to provide a fixed basis of comparison with other phosphors. (NBS)



7. Extraction of 4 teeth in two patients undergoing protracted bishydroxycoumarin therapy was undertaken. Profound bleeding resulted. In such patients, extraction of teeth should be attempted only after bishydroxycoumarin has been withheld sufficiently so that prothrombin time has returned at least to within the upper limits of normal range. When hemostasis is certain, prompt resumption of this valuable chemotherapy may be undertaken. (Oral Surg., May 1958; I. W. Scopp, DDS, H. Fredrics, DDS)
8. The anesthetic technique used in 1029 laryngectomies without mortality directly attributable to anesthesia is reported. Possible complications are discussed. (Cancer, May - June 1958; C. P. Boyan, M.D., W. S. Howland, M.D.)
9. The author reviews briefly some of the more important items utilized in the differential diagnosis of the acute abdomen. There is no substitute for a good history and a careful physical examination. In most instances, the decision for or against operation will be settled this way. (Gastroenterology, May 1958; H. L. Bockus, M.D.)
10. Cantharidin was evaluated as a local therapy for warts in 61 patients. It was found especially useful in the treatment of periungual warts. It has merit in selected cases of ordinary and plantar warts, but is not recommended for mosaic warts. (Arch. Dermat., May 1958; W. L. Epstein, M.D., A. M. Kligman, M.D.)
11. The most common disorders of the nervous system involve the vascular system. Because of their frequency, these illnesses are encountered often in general practice. In recent years, a great deal of study has been devoted to these illnesses and considerable new knowledge has accumulated concerning their diagnosis and treatment. A review of these newer studies is presented. (Postgrad. Med., May 1958; A. Iannone, A. B. Baker)
12. Intramural hemorrhage is a common complication of atherosclerosis and was found in 70% of men and 28% of women over 45, but in no patient under that age. The possibility that these hemorrhages may be a factor in the precipitation of acute occlusive lesions of coronary arteries is discussed. (Circulation, May 1958; T. M. Blake, M.D., P. K. Springer, B.S.)
13. Fifty-four of 122 patients with temporal arteritis observed at the Mayo Clinic had some impairment of vision due to that disease. Fifteen were blind in both eyes; 18 were blind in one eye. The most common local cause of the loss of vision was acute ischemia of the optic nerve. (Am. J. Ophth., May 1958; H. P. Wagener, M.D., R. W. Hollenhorst, M.D.)

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Board Certifications of Reserve Officers (Inactive)American Board of Anesthesiology

LTJG Bruce V. Landry (MC) USNR

LT James E. Matson (MC) USNR

American Board of Internal Medicine

LT James E. Crockett (MC) USNR

LTJG Carlton R. Daniel, Jr. (MC) USNR

LTJG Robert P. Davis (MC) USNR

LT Billy R. Jones (MC) USNR

LTJG Richard D. Judge (MC) USNR

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LTJG Major Darst, Jr. (MC) USNR  
LCDR Robert K. Finley, Jr. (MC) USNR  
LT Robert W. Hopkins (MC) USNR

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Orange Juice for Blood Donor Centers

In many Blood Donor Centers, it is a common practice to serve orange juice to prospective blood donors. The primary purpose has been to give the donor a readily available supply of carbohydrate in order to decrease the incidence of syncope.

Due to the scarcity and expense of orange juice, it may be of value at this time to stress the fact that any sweetened drink will serve this purpose. (Capt. J. J. Engelfried MSC USN)

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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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BUMED NOTICE 6710

20 May 1958

From: Chief, Bureau of Medicine and Surgery  
To: All Naval Hospitals, Activities Having Station Hospitals, and  
Naval Dispensaries  
  
Subj: Control of high priced standard and nonstandard pharmaceutical  
items

Ref: (a) NavRegs Art. 0717  
(b) ManMed Arts. 3-34, 3-35, and 25-13(9)

This notice informs addressees of the necessity to review local procedures to prevent any wasteful, improper expenditure, or unauthorized use of high priced pharmaceuticals.

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BUMED INSTRUCTION 11110.3

2 June 1958

From: Chief, Bureau of Medicine and Surgery  
To: Distribution List

Subj: Factors to be used in developing the medical portion of Military Construction Programs and data required in justification

Ref: (a) BuMedInst 11110.2  
(b) SecNavInst 11013.12

This instruction provides factors for use by sponsoring bureaus and offices in determining the size and scope of medical facilities required.

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BUMED INSTRUCTION 12230.2

5 June 1958

From: Chief, Bureau of Medicine and Surgery  
To: All BuMed Managed Activities

Subj: Program for retirement planning and preparation

Encl: (1) Copy OIRNOTE 12230 of 8 April 1958

This instruction distributes the policy and procedural statement relating to the Department of the Navy's recently adopted program for providing counseling to prospective civilian retirees and to advise activities concerning its implementation.

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The printing of this publication was approved by the Director of the Bureau of the Budget, 16 May 1955.



**DENTAL****SECTION**Navy Dental Care

Approximately 185,000 patients receive dental care each month in Navy dental facilities. These patients include active and retired Navy and Marine Corps personnel; members of the Army and Air Force when on active duty where their own dental services are not available or when on detached duty with the Navy; and certain categories of dependents who are eligible for dental care under the Dependents' Medical Care Act.

Approximately 650,000 procedures are accomplished each month. These include about 275,000 filling procedures, 7000 prosthetic procedures, 30,000 oral surgery procedures, and 50,000 periodontic procedures with dental care for dependents accounting for one-fourth of all dental procedures accomplished overseas.

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Naval Hospitals Approved by A. M. A. Council  
on Hospital Dental Service

- U. S. Naval Hospital, Annapolis, Md.
- U. S. Naval Hospital, National Naval Medical Center, Bethesda, Md.  
(U. S. Naval Dental School provides dental service)
- U. S. Naval Hospital, Naval Base, Bremerton, Wash.
- U. S. Naval Hospital, Camp Lejeune, N. C.
- U. S. Naval Hospital, Camp Pendleton, Calif.
- U. S. Naval Hospital, U. S. Naval Base, Charleston, S. C.
- U. S. Naval Hospital, Chelsea, Mass.
- U. S. Naval Hospital, Corpus Christi, Texas
- U. S. Naval Hospital, Great Lakes, Ill.
- U. S. Naval Hospital, Naval Air Station, Jacksonville, Fla.
- U. S. Naval Hospital, Memphis, Tenn.
- U. S. Naval Hospital, Naval Base, Newport, R. I.
- U. S. Naval Hospital, Oakland, Calif.
- U. S. Naval Hospital, Pensacola, Fla.
- U. S. Naval Hospital, Philadelphia, Pa.
- U. S. Naval Hospital, Portsmouth, Va.

U. S. Naval Hospital, Quantico, Va.  
U. S. Naval Hospital, San Diego, Calif.  
U. S. Naval Hospital, St. Albans, Long Island, N. Y.  
U. S. Naval Hospital, Guam, Marianas Islands

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## RESERVE SECTION

### Active Duty for Training During Fiscal Year 1959

The below listed courses representing a portion of the active duty for training authorized for fiscal year 1959 are for the information of eligible inactive personnel in pay and non-pay programs of the Naval Reserve.

#### DIVING MEDICINE

U. S. Naval School  
Deep-Sea Divers  
U. S. Naval Gun Factory  
Washington, D. C.

4 August 1958

Description. Didactic training and underwater physiology and in the recognition and treatment of casualties associated with any kind of diving. Instructions include lectures and demonstrations of the equipment of the Deep-Sea Divers' School and experimental diving unit. This course is given for active duty personnel enroute to stations where there is some diving activity; however, vacancies in the course may be filled by Reservists on active duty for training.

Eligibility Requirements. Naval Reserve Medical and Medical Service Corps, male officer personnel only. Quotas have been authorized for the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts.

#### SEMINAR - COMMANDING OFFICERS OR THEIR REPRESENTATIVES, NAVAL RESERVE MEDICAL COMPANIES

Bureau of Medicine and Surgery  
Navy Department  
Washington, D. C.



20 - 24 October 1958

Description. To provide indoctrination and orientation in the organization, administration, and operation of the Naval Reserve Program from the departmental level with particular emphasis on the medical components. Field trips to the National Naval Medical Center and other facilities in the Washington, D. C. area will be conducted. A series of meetings will be held between the trainees and officers of the Navy Department with a view toward an improved Medical Reserve Program through the exchange of ideas and recommendations.

Eligibility Requirements. Members of Naval Reserve Medical companies with priority being given to commanding officers, executive officers, and training officers in that order. Quotas have been authorized for the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts.

#### SEMINAR - COMMANDANT'S REPRESENTATIVES

Bureau of Medicine and Surgery  
Navy Department  
Washington, D. C.

4 - 8 August 1958

Description. Designed to familiarize Commandant's Representatives with all aspects of the Navy's training program for undergraduate and graduate medical students.

Eligibility Requirements. Reserve Medical Department officers who are serving as Commandant's Representatives for purposes of recruiting for the Ensign, 1915 (Medical) (formerly 1995) program. Quotas have authorized for the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts.

#### MEDICAL MILITARY TRAINING

U. S. Naval Medical School  
National Naval Medical Center  
Bethesda, Md.

9 March 1959

Description. First week will be devoted to Medical Aspects of Special Weapons and Radioactive Isotopes with particular reference to personnel casualties from atomic explosions. Second week will be devoted to professional topics of concern to military medicine, including discussions on Reserve Medical Programs of the Armed Forces.

Eligibility Requirements. Naval Reserve Medical Department Officer personnel. Quotas have been authorized for the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts.

As the assignment to active duty for training is a matter within the cognizance of the respective Naval District Commandants, interested Naval Reservists should communicate with their Commandants concerning the above listed courses.

Note: Other types of active duty for training available during fiscal year 1959 will be published in succeeding issues of the Medical News Letter.

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### AVIATION MEDICINE DIVISION



### Psychological Aspects of Survival the Seven Enemies of Survival

#### Introduction

In recent years, many advances have taken place in the development of clothing, equipment, and rations for survival and in the techniques for their use. However, regardless of the quality of the equipment and the techniques for its use, when faced with a survival situation, man still has himself to contend with. Man's psychological reactions to the stresses of the survival situation often render him unable to utilize his potential or available resources.

Although knowledge in this field is far from complete, enough has been acquired to throw light and understanding on some of the major psychological factors involved. Most of this knowledge can be termed "common sense," but it must be realized that common sense itself is based on past experiences which have led to successful adjustments to various situations and that the inability to apply this common sense when under stress has led to the deaths of numerous very able and apparently sensible aircrew.

One of the really significant psychological requirements for survival is the ability to accept—immediately—the reality of any new emergency situation and to react appropriately to it.



Studies conducted at the USAF Advanced Survival School have demonstrated that survival knowledge contributes to the feeling of confidence in one's own ability to survive. Because self-confidence is so important in handling both fear and panic, survival knowledge should serve to minimize fear and to prevent panic.

Training in survival must aid at realism, but safeguards must, however, be taken to avoid casualties. Men must sense that they have passed through real danger and have done so unharmed. That such "survival inoculation" training has permanent value may be doubtful and from time to time a "booster shot" of survival training may be required to reactivate the value of the original "inoculation."

### Major Psychological Factors Involved in Survival

Fear. Fear is a normal and fundamental reaction in any emergency situation which threatens essential needs. Fear influences man's behavior and, in consequence, his chances for survival. Fear may destroy, or on the other hand, may improve his chances of survival. There is always something which can be done to improve any survival situation and there is nothing to be gained by avoiding fear through denying the existence of danger. It is essential that fear in the face of danger be accepted as a perfectly normal reaction rather than be looked upon as a shameful one. This acceptance will lead to purposive action rather than random behaviour and will greatly increase the chances for survival. The manner in which the individual reacts to fear will depend rather on himself than on the situation. It is by no means the rule that the physically strong or happy-go-lucky individual will most effectively handle fear; timid or normally anxious individuals frequently respond more coolly and effectively under stress than the former and consequently have a better chance for survival. Fear must, therefore, be recognized, accepted, lived with, and if possible, put to advantage.

The factors increasing fear are most often helplessness and hopelessness. It is reported that some of the factors which most frequently decrease or assist in controlling fear are:

- (a) Having confidence in the survival equipment
- (b) Having confidence in the technical ability of one's immediate superior or person in command
- (c) Concentrating on the job to be done

### The Seven Enemies of Survival

These seven enemies are pain, cold, thirst, hunger, fatigue, boredom, and loneliness. Everyone has experienced these at some time, but few have known them to a degree where life is threatened. In a survival situation, these feelings of pain, cold, et cetera, are in no wise different from those



experienced elsewhere except in the degree and danger to life involved. With these feelings, as with fear, the more knowledge you have of their effects on the individual, the more easily will their control be achieved.

Pain. Pain is one of Nature's ways of drawing attention to something that is wrong with the individual, but Nature also has ways of holding off pain if the individual is too busily engaged on some other activity to pay heed to the cause of the pain for the time being. In the survival situation, these seven enemies may be held at bay if the individual is wholly occupied with plans for his survival. A special effort must therefore be made to sustain hope and cheerfulness and to keep working for survival. Pain may get the upper hand, even though it is not serious or prolonged, if it is permitted to do so. If pain is given into, the drive to survive may be fatally weakened.

Cold. Cold is a greater threat to survival than may be realized. It not only lowers the capacity to think rationally, but also tends to lower the will to do other than get warm again. It is thus an insidious enemy numbing the mind and body and the very will to survive.

Thirst. Even when thirst is not extreme, it can dull the mind. Thirst, as with pain and cold, however, can be almost completely ignored if the will to survive is sufficiently strong. It is equally important, however, not to unnecessarily deprive oneself of water because serious dehydration may occur in a survival situation despite there being plenty available water.

Hunger. Hunger, like thirst, is dangerous in the survival situation primarily through decreasing the individual's ability for rational thought. Hunger and thirst also increase susceptibility to the weakening effects of fear, pain, and cold.

Fatigue. Since it is usually impossible to avoid some degree of fatigue in the survival situation, it is necessary to understand its effects and thereby make allowances for them. Even a very moderate amount of fatigue can substantially reduce mental ability. Fatigue can make the individual careless and increasingly prone to develop a feeling of "just not caring." This is one of the greatest dangers in survival. It is often mistakenly presumed that fatigue and energy expenditure are directly related. This confused belief may be responsible for many deaths in survival situations. There is certainly always a real danger of over-exertion, but fatigue may actually result from hopelessness, from lack of goal orientation, from dissatisfaction, from frustration, or from boredom. Fatigue may represent an escape from a situation which seems to have become too difficult to support. That is why it is so important to understand its nature. If the individual recognizes the dangers of a situation, he can often summon the strength to go on.

Boredom and Loneliness. These are two of the toughest enemies of survival because they are unexpected. When nothing is happening, when something anticipated is not realized, when the individual must remain still, quiet and alone, these feelings may become unsupportable and lead to reckless decisions and dangerous activities.



### Set for Survival

By "Set" is meant a preparatory attitude or state of readiness. In the survival sense, it implies being mentally prepared for survival should the need for survival action arise.

While some "sets" are essential to survival, others may greatly endanger the chances of survival. As an example of the latter, the mental "set" that "it can't happen to me" can blind one to the reality of the situation and make appropriate reaction in the face of emergency, impossible. A "set" which is too strong may also prove dangerous.

Much of the available evidence demonstrates the importance of having a "preparatory set" for whatever emergency may occur. This requires preparation and rehearsal for all emergency possibilities. This may be assisted by survival instruction given through posters, movies, and lectures. In this way, "preparatory sets" are developed which later may serve as guides to action. Knowledge of the experiences of others may also serve as a "set" for action. It has been found from experience that previous rehearsal, both mental and factual, of emergency procedures may operate as a "set" resulting in automatic action.

The most frequently encountered "set" endangering survival chances is that of "it cannot happen to me." This is the antithesis of the "preparatory set." Failure to have any "set" at all for survival may result in panic even in individuals who under normal conditions appear to be extremely calm. The too-strong "set" may also endanger survival because the individual cannot give it up when it is no longer useful.

Knowledge and rehearsal of survival and emergency procedures not only create a feeling of confidence and a "preparatory set" for survival, but also have been shown to operate even when the survivor is in a state of semi-consciousness during an emergency.

### Group Behaviour in Survival

A crew's chances of surviving depend largely on its ability to organize activity. A tight situation does not automatically weld a crew together; rather the more difficult and disordered the situation, the greater are the disorganized crew's problems. This is particularly true in the face of common danger, when fear can result in panic rather than concerted action. High group morale exists when all crew members feel themselves to be part of the crew rather than individuals and are proud to be members of that crew. High group morale has these advantages:

- (a) The individual feels strengthened and protected because he realizes that his survival depends on others whom he trusts.
- (b) The group can meet failure with greater persistency.
- (c) The group can formulate goals to help each other face the future.

High morale must come from internal cohesiveness of the group, not merely through external pressures. Under certain conditions, moods and attitudes may become wildly contagious, but panic may often be prevented by conscious well-planned organization and leadership based on the delegation or sharing of responsibility, combined with faith in the group and a realization of the need for cooperation.

### Important Factors in Successful Group Survival

(a) Organization of manpower. Organized action, where crew members know what to do and when to do it, both in routine and emergency circumstances is an excellent way of combating panic. An important technique for achieving organized action in survival is to keep the crew well briefed.

(b) Selective use of personnel. In well organized groups, the individual is allotted the job which most closely fits his personal qualifications.

(c) Acceptance of suggestions and criticisms. Although some one person, such as the aircraft commander, must accept responsibility for final decisions, he still can make good use of others' suggestions and criticisms.

(d) Consideration of available time. Hundreds of survival reports indicate that there is rarely unlimited time in which to make decisions. On-the-spot decisions which must be acted upon immediately usually determine survival success.

(e) Equipment checking. In more cases than will ever be definitely established, failure to check equipment has presumably resulted in failure to survive.

(f) Surveying the situation. The need to survey the situation in problem solving is widely recognized. Frequently, the things most feared are those involving the unknown. Surveying the situation serves to reduce or remove those unknowns and to set in readiness powers of adjustment.

(g) Understanding instructions. Investigations have clearly established that the confidence in one's own ability to survive is bolstered by acquiring survival knowledge and know-how.

(h) Reaction speed. In survival emergencies, previously established reaction patterns are important in enabling the group to react quickly. One authority claims that one significant object of survival training is to afford an opportunity for knowing and understanding the responses which groups and individuals need to acquire. Well established patterns of response may operate even in the presence of shock or panic.

### Personality and Survival

Survival may depend more upon individual personality than upon the degree of danger, the weather, terrain and the nature of the emergency.



Whether fear shall lead to panic or act as a spur to greater sharpness, whether their fatigue shall overcome the individual or leave him able to take the necessary action to survive, shall to a large extent be more dependent upon the individual than upon the situation.

### Personality Assets in the Survival Situation

(a) Decisiveness. The individual's ability to make decisions and act decisively.

(b) Ingenuity. The individual's capacity for improvisation through the quality of ingenuity.

(c) Self-Sufficiency. Some people cannot bear to be alone; others can fend for themselves, make a good thing out of a bad one and keep their own and others' spirits high.

(d) Flexibility of Temperament. The individual must be able to rock with the punch. Some people cannot change themselves, no matter how much their stubbornness costs. Others can readily adjust themselves to the new situation.

(e) Intrepidity. The capacity to remain unshaken in the face of adversity and to remain cool and calm when confronted with danger and the unknown.

(f) Optimism. To hope for the best, but prepare for the worst.

(g) Prudence. To hold one's horses and act only after due thought and deliberation.

(h) Courage. To face up to the worst. Few people know how much they can really take, but expecting things to be tough or unpleasant helps in preparing to meet the worst that may happen.

(j) Intuition and Cooperativeness. The ability to figure out the other man. To be attuned to the individual and group feeling and moods and to size up other people and predict what they are going to do. Equally important to survival is the ability to cooperate with others and to promote harmony and offset discord and strife.

(k) Personal Insight. To know the source of one's own special fears and worries so that control over them may be exercised.

### Summary

Much of the information we possess on survival is either common sense or common knowledge, but because we have lived with these factors, successfully, under normal conditions, we may unfortunately assume that we have nothing new to learn and that we shall respond adequately to their influences when under stress. Nothing is farther from the truth, as the great number of persons who thought they could do so successfully are in too many instances dead. Sound and realistic training in survival is essential as it will provide invaluable conditioning for the real survival situations.

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(Flight Officer E. M. Beldam, Aeromedical Reports, Institute of Aviation Medicine, Royal Canadian Air Force, Toronto, Canada, October 1957)

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Cold Water Immersion

The following is, in part, an article on cold water immersion that one of the senior flight surgeons produced and distributed to all aviators within his sphere of influence. It is felt that this will be of interest to a great number of those reading the Aviation Medicine Section of the News Letter.

"Needless to say that the greatest danger after abandoning aircraft in cold climates is from the various effects of cold, the most immediate effect being excessive body cooling which may result in death caused by failure of the heart. Fatal cooling is more apt to occur in water than in air because wetting greatly decreases the insulating effect of clothing, and water displaces the layers of still air that normally surround the body and hold the heat inside. Actually, therefore, ordinary clothing gives no protection against cold to anyone immersed in water.

Death from immersion in very cold water at 50° F. and below has been reported to occur within a very few minutes after abandoning an aircraft.



The duration of survival at higher temperatures indicated in the following table as "indefinite" implies that men can survive for several days (4 or more). After that length of time, factors in addition to chilling, such as fatigue, contribute to collapse and drowning. Even when water temperature is as high as 70° F., the time that a man may remain in water is limited to approximately 40 hours. A gradual fall in body temperature will take place and the blood volume will decrease because of the transmission of blood fluid to the tissues when the temperature falls.

Partly on the basis of laboratory experiments, the estimates given in the following table (NavShips 250-533-7) have been made of the period of survival which can be expected by a man without watertight clothing when immersed in water at various temperatures. While these figures are approximately correct, it should be emphasized that considerable deviations are to be expected among individuals. This is shown by the large span of duration at higher temperatures. Because men have lived for many hours longer than the indicated figures, the search for survivors should not be stopped merely because the table shows that some of them may have succumbed to the effect of cold.

The "Mae West" should be worn even more frequently during the winter months. Should you unavoidably take a swim, it will not be long before the cold will slow down your activities or even throw you into deep shock. Good old "Mae" will keep you floating until the arrival of the crash boat or helicopter. Cases are known of resuscitation even after a complete standstill of the heart.

Food and exercise increase body heat production and are of value in protection against cold—another reason for the well balanced diet we have been harping on so often. Despite popular opinion, alcoholic beverages will cause a loss of body heat; the blood vessels of the surface of the skin dilate allowing the heat to escape.

TABLE

REPRESENTATIVE SURVIVAL TIMES

<u>Water Temperature (Fahrenheit)</u>	<u>Duration of Survival (Hours)</u>
32 deg. - - - - -	Less than 1 hour
40 deg. - - - - -	1/2 to 3
50 deg. - - - - -	1 to 6
60 deg. - - - - -	2 to 24
70 deg. - - - - -	3 to 40
80 deg. - - - - -	Indefinite

Treatment: The belief that rapid rewarming of chilled survivors is dangerous has been disproved by competent investigators. Survivors whose body temperatures have been lowered to levels which can be fatal should be rapidly rewarmed. The manner of rewarming is most important; half-way measures are not good enough.

Quote from the November 1957 Approach: "Mild cold injury calls for slow rewarming, while frozen extremities or acute body chilling requires rapid rewarming."

Hot water, not too hot, but warmer than body temperature, should be used for rewarming the body. The body will cool the bath quite rapidly. A conscious or unconscious chilled survivor should be undressed immediately and placed in a bath heated to about 120° F. for 10 minutes, then gently dried with a towel and placed in warm blankets. Water heated to even 115° F. will be painful to him if he is conscious, but it is the best method of insuring survival. He will not be scalded by water at this temperature. If his temperature does not rise, he should again be placed in hot water until his temperature reaches 93° F. His temperature will then continue to rise after removal from hot water. Medical authorities advise that a more gradual rewarming is indicated as soon as the immediate danger from extremely low temperatures has passed.

If a shower must be used, the body should be wrapped in towels, a good jet should be started and the wrapping kept saturated with hot water at temperatures of 120 to 125° F. If hot water is not available, it is safer to use blankets in a warm room. The man will shiver and stay cold longer but will not cool further.

Survivors who are conscious when rescued from cold water will often survive without the aid of a warm bath if they are placed in warm blankets. Survivors who are exposed to moderately cold temperatures for relatively long periods should be rewarmed much more slowly, preferably by the use of heating pads or blankets.

Massaging is to be avoided under all conditions!"

(Capt. Russell G. Witwer MC USN)

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#### CAA Second Class Airman's Medical Certificate

Pertinent instructions for conducting the physical examination and preparing the SF-88 for Civil Aeronautics Administration Second Class Airman's Medical Certificates are as follows:

- (a) BuMed Instruction 6120.11A of 23 April 1957
- (b) Guide for Medical Examiners (available on letter request from U. S. Dept. of Commerce, Civil Aeronautics Administration, Washington 25, D. C.)



The most frequent errors noted in reviewing SF's-88 for CAA Certification are as follows:

- (a) Submission of SF-88 on personnel ineligible to receive CAA Certificate
- (b) Improper information in block #5 of SF-88. The only information that will be entered in block #5 is "CAA Certification."
- (c) Failure to complete block #17
- (d) Incorrect statement under block #77 of the SF-88. The correct statement is "Physically qualified for a Civil Aeronautics Administration Second Class Airman's Medical Certificate."
- (e) Incorrect mailing address in block #4. The address entered in block #4 of the SF-88 shall be the address to which the requested medical certificate will be forwarded by this office.

(NavAirLant Medical News Letter of 8 May 1958)

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#### Who's On First?

An enlisted man in the rear compartment of an AD5W plane complained of dizziness and nausea while in flight; this prompted the pilot to return to base. The man was taken to the Station Hospital in a state of convulsions. He had a cherry-red complexion. Carbon monoxide blood tests indicated 50-60 percentage of blood saturation; one hour later, this had dropped down to 12.5%. This man had been in flight 1.9 hours; he was in a prior flight 2.4 hours with a break of 30 minutes between flights. The pilot and another enlisted man in the forward compartment experienced no ill effects whatsoever. Air sampling for carbon monoxide made shortly after the plane landed revealed no carbon monoxide present. Extensive investigations including smoke tests for leaks and carbon monoxide tests while in flight revealed no abnormalities.

(BuMed Occupational Health Reports)

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#### Emergency Air Access A-13 Oxygen Mask-Seat Kit Regulator Assembly (7160-71811)

Evaluation of an emergency air access valve has shown that respiratory function is adequately supported at ground level when the A-13 oxygen mask is connected to a depleted oxygen system of a survival seat kit. The valve, Air Lock Part No. AL-358, is incorporated in the standard T-block attached to the oxygen regulator hose. The other components of the system are a 6-inch extension hose, a 2-to-1 reducer adapter, and the MC-3 connector on the mask hose.

The valve was used continuously for 30 minutes at ground level by each test subject. Although light resistance was noticeable, breathing was not difficult or fatiguing. There was no change in pulse or respiratory rate. Carbon dioxide accumulation from rebreathing expired air is not a problem with this system because of the small dead space volume of the A-13 mask. With this valve, an injured airman, capable of breathing but unable to disconnect his oxygen mask during bailout, could obtain air after depletion of his emergency oxygen supply, provided the emergency valve inlet was unobstructed on landing and fully accessible to the surrounding air. (Activity Rep. (RCS-U16), Aer-MedLab, Wright-Patterson AFB)

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Transverse Acceleration of Subjects Immersed  
in Water (7216-71712)

The transverse acceleration tolerance of semi-supine subjects immersed in water has been investigated. During acceleration, respiration was maintained by supplying air under pressure through an aqua-lung (skin diver's) valve. The following acceleration times were tolerated without blackout: 12G, 3 min. 50 sec; 10G, 4 min. 10 sec; 8G, 6 min; and 6G, 15 min. These values are considerably in excess of the tolerances of the same subjects in the same position when not immersed in water, and represent more than 100% increase over the best previously reported acceleration-time tolerances. It is concluded that water immersion in the semi-supine position offers the most effective known anti-G protection. (Activity Rep. (RCS-U16), AerMedLab, Wright-Patterson AFB)

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